FACTORS INFLUENCING THE ADOPTION OF ORGANIC FARMING BY THE FARMERS OF NORTH DISTRICT OF SIKKIM

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ABSTRACT

A study was conducted on 90 farmers randomly selected from two villages under the Mangan development block of North district, Sikkim. To find out the important factors responsible for adoption of organic farming, 20 independent variables and one dependent variable were selected for the study. Data were collected by personal interview methods in the months of October and November 2014 by the researcher. For analysis of the data, coefficient of correlation and factor analysis was followed. It was found that education, annual income, organic farming experience, use of mass media, Institutional approach towards promotion of organic farming and innovation proneness were positively correlated and significant with adoption of organic farming whereas farm size was negatively and significantly correlated and eight important factors were identified such as motivator, family capacity, livelihood, farm economy, socio-economic, education, land holding and resource use efficiency which are also associated with adoption of organic farming in Sikkim.

INTRODUCTION

The word Organic means living, earth friendly or of plant and animal origin. It contrasts with the farming wherein no chemical inputs are used. It also denotes the products that have been produced in accordance with certain norms and standards during cultivation, handling, processing and marketing stages. According to International Federation on Organic Agricultural Movement (IFOAM), Organic agriculture is an

agricultural system that promotes environmentally, socially and economically sound production of food, fiber, timber etc. In this system soil fertility is seen as the key to successful production. Working with the natural properties of plants, animals and the landscape, organic farmers aim to optimum quality in all aspects of agriculture and environment. Organic farming is one of several approaches to sustainable agriculture (FAO, 1999); Furthermore, Organic agriculture is one of the most dynamic and rapidly-growing sectors of the global food industry (Ellis *et al.* 2006). Because of its commercial viability, and it may provide solutions to the current problems in conventional agriculture (Scialabba, 2000). Lampkin and Padel (1994) reviewed the evidence on the motivations of organic farmers, and identified the most common factors among organic producers as concerns about their family's health, concerns about husbandry (*e.g.,* soil degradation, animal welfare), lifestyle choice (ideological, philosophical, religious) and financial considerations. Mahamud (2005) mentioned significant factors affecting the acceptance of organic rice production as level of organic agriculture knowledge and extension measures received from involved agencies. Adoption of a new technology is influenced by physical, socio-economic and mental factors; similarly, farmers' attitudes determine adoption of improved technology (Rogers, 2003). The present study was conducted to find out the relationship between some independent and dependent variables with respect to adoption of organic farming and identify important factors contributing to adoption of organic farming.

MATERIALS AND METHODS

The research was conducted at Mangan development block of North district of Sikkim. The purposive as well as simple random techniques were adopted for the study. The district, block and villages were purposively selected for the study. Under the Mangan development block two villages namely Namok and Robi-Chongthong, were selected. A total of ninety respondents (50 farmer from Namok and others 40 farmer from Robi-Chongthong) have been selected by random sampling method. The data were collected in the month of October and November 2014 by personal interview method with the help of interview schedule. The independent variables used were Age(X1), Education level(X2), Family size(X3), Family type (X4), Occupation(X5), Farm size (X6), House type (X7), Farm power (X9), Source of income (X9), Annual income(X10), Cropping intensity (X11), Availability of irrigation water(X12), Institutional approach towards promotion of organic farming(X13), Organic Farming experience (X14), Farm machinery(X15), Use of mass media(X16), Cosmopoliteness (X17), Innovation proneness (X18), Economic motivation(X19), Market opportunity(X20) and dependent variable was Adoption(Y) of organic farming.

2.1 Statistical Analysis

For analysis of data Coefficient of correlation and factor analysis using principle component method was used. Factor analysis involves Eigenvalues extraction of factors, rotation, and interpretation of factors.

2.2 Principle Component Analysis (PCA)

The Principle component analysis extracts m-eigenvectors (Principle component axes) and corresponding m-eigenvalues (the variance measured along the eigenvectors), from m x n symmetrical matrix of correlation. The eigenvectors obtained from the Principle

component analysis are all orthogonal (i.e. inter-column correlations are near zero). The eigenvalues account for the all original data variances in decreasing order such that each has variance or eigenvalues less than the previous ones. The total of the eigenvalues $\lambda 1 + \lambda 2 \ldots\ldots + \lambda m$ which is the same as the sum of variances constituting the diagonal or trace of the correlation matrix before transformation. The principle components are then converted into factors by multiplying each elements of the principle component or eigenvector (V) by square-root of the corresponding eigenvalues ($\lambda^{(1/2)}.vV$). Factors, thus, besides the direction also represent the variances.

2.3 Extraction of Factors

The principle component methods, as is known, is a method of 'breaking down' a covariance or correlation matrix into a set of orthogonal component or axes equal in number of variates concerned (Kothari, 1996). The number of factor extracted was 8.

RESULTS AND DISCUSSION

Table: 1.Indicates that education, annual income, organic farming experience, use of mass media, Institutional approach towards promotion of organic farming and innovation proneness are found to be positively correlated and significant with adoption of organic farming whereas farm size was negatively and significantly correlated with the adoption of organic farming by the farmers. Same statistical analysis was followed by Prashanth, *et al.* (2014).

Education simmers the process of cognitive changes, motivational changes and motor change in a positive direction and helps the respondents move for a wider and diverse exposure to farm enterprise and farm operation and consequently build of meticulous observation of yield decline or change. Here education has been recorded to be positively and significantly correlated to adoption of organic farming. The operational link can be like that education provides a pseudo urbanite disposition and utilitarian role in increasing the organic farming experience by adapting modern technology being supported by annual income and availability of irrigation facilities.

Institutional support has also got positively significant correlated with the adoption of the organic farming. Since institutions supports comprises of government or private which are considered as the pillars and provides quality inputs such as seeds, manures and conducts need base training for organic farming development which in turn helps farmers to produce quality produce. It was found that those farmer who have joined training and workshop programme conducted by the various government and NGO, s institution those farmers are more prone to adopt organic farming as compare t farmers who do not attend any training programmes.

Organic farming experience was also positively correlated with the adoption of organic farming. Because highly experienced farmers possess better idea about the quality and market potentiality of the organic products and sustainability nature of the organic farming which provides better health and environment for present and future generation. It was also found that Innovative proneness and use of mass media were also found to be positively significant as these attributes helps to enrich the attitude of individuals towards quality of organic products through awareness creation and important of organic farming .

Farm size was found to be negatively correlated with adoption of organic farming. The reason which were mentioned by the farmers are difficulties in management of crop land and lack of farm implements, inputs and external supports and also lack of motivation are which leads to difficulties in management of organic farming as its required a special attention to meets its mentioned attributes in both management and production.

But Oladele (2005) found in his study that parameters that have been influencing the adoption behavior of farmers who adopt the technology were demographic variables, technology characteristics, information source, knowledge, awareness, attitudes and group influence affect adoption behavior.

Table: 2. Identification of the intra and inter level of interactions between the independent variables

Table-2: presents the principal component analysis for identifying operational factors that have put up through an intrinsic relational conglomeration of the variables to ultimately form a homogenous group of variables called factors. It has been found that 20 independent variables have been conglomerated into 8 factors.

The most important factor in adoption of organic farming is **"Motivator"** which explained 19.148 per cent of the total variance. It was found that Institutional approach towards promotion of organic farming, use of mass media, cosmopoliteness, innovation proneness, and economic motivation are found to be associated with factor motivator. Motivation is a covert exerted drive which influences a person to move from one initial situation another, such as adoption or replacing old venture with a new venture in order find out the relative advantages of the new venture and gain some benefit from it.

The second important factor in adoption of organic farming is **"Family capacity"** which explained 12.706 percent of the total data variance. Family capacity refers to the ability of the family to cope up with the situation in distress condition such as risk in adopting organic farming in place of traditional crop cultivation. It was found that organic farming is full of risk and uncertainty in both production and marketing aspect that is why; family capacity plays an important role in adoption of organic farming.

The third important factor is **"Livelihood"** which explained 12.706 percent of the total data variance. Most of the farmers in Sikkim are subsistancial in nature that is only extended to family consumption with no marketed surplus. It was found that livelihood generation plays a key role in adoption of organic farming because farmer perceived that organic farming may be a new venture and have a great potential in improving both health and environment issues for present and future aspect but farmers also thinks that it is full of risk and uncertainty.

The fourth important factors responsible for the in adoption of organic farming are **"Farm economy"** which contributes 7.595 percent of the total data variance. It was found that annual income, farm implements possession were associated with farm economy. In order to adopt organic farming, farmer must understand the complexity o because organic farming required critical management in both inputs and management aspects such as critical use of chemical pesticides and fertilizers. That is why farm economy of the farmers plays a vital role in adoption of organic crops farming.

The fifth important factors responsible for the adoption of organic farming is **"socio economic condition"** which contributes 7.069 percent of the total data variance. Socio-economic is consisting of age and house type of farmers. Age provides an important key role

in venturing new innovative ideas, as younger age farmers are ready to venture organic farming because they more curious and risk taker but older farmer feels it's full of risk in adoption of organic farming. The result is in accordance with research by Hersman (2004).

The sixth Factor associated with adoption of organic farming is **"education"** which contributes 5.589 percent of the total data variance. Education is the prime important component in changing human behaviour such as change in perception and attitude of the person in a right direction. Education simmers the process of cognitive changes, motivational changes and motor change in a positive direction and helps the farmers to move for a wider and diverse exposure to farm enterprise and farm operation and motivates to try new venture and adopt certain technology which could help in improving farmer's socio-economic condition.

The seven Factor associated with adoption of organic farming is **"farm size"** which contributes 5.272 percent of the total data variance. Farm size indicated total land area posses by the farmer in a specific time. It was found that the smaller farmers practices organic farming more regularly and grows their crops in fully organic manure where as large farmers hardly practices organic farming because of large farm area because it is associated with difficulties such as management, labor extensive and full of uncertainty of crop failure and market risk.

The eight Factor responsible for the adoption of organic farming is **"Resource use efficiency"** which contributes 5.056 percent of the total data variance has accommodated only two variable i.e. availability of irrigation and market opportunity. In case of organic farming, utilization of resource available plays key role in production of organic produces. As inputs and production of organic farm products required a careful and minimum use of chemical compounds. Therefore farmer must understand the basic logic behind the organic farming and its importance both for human and environmental aspects.

But Rezvanfar, *et al.* (2011) found that farmer perception, motivation about organic farming and participation in extension activities are the main determinants of organic farming among small farmers in Iran and Kafle (20111) points out three factors, farmers participation in organic farming related trainings and visits, farm size and compatibility of organic farming to their situations as the main determinants of adoption of organic farming among farmers.

CONCLUSION

The study was conducted to identify important factors responsible adoption of organic farming by the farmers of north district, Sikkim. In this study it was found that variables like education, annual income, organic farming experience, use of mass media, Institutional approach towards promotion of organic farming and innovation proneness were positively correlated and significant whereas farm size was negatively and significantly correlated with adoption of organic farming and eight important factors were identified such as motivator, family capacity, livelihood, farm economy, socio-economic, education, land holding and resource use efficiency which are also associated with adoption of organic farming in Sikkim.

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APPENDIX

Table 1
Co-efficient of correlation (r) between independents variables and adoption of organic farming.

Variables	r-value
Education(X_2)	**0.257***
Farm size (X_6)	**- 0.233***

Annual income(X_{10})	**0.221***
Institutional approach towards promotion of organic farming(X_{13})	**0.288****
Organic farming experience(X_{14})	**0 .238***
Use of mass media(X_{16})	**0.229***
Innovation proneness(X_{18})	**0 .297****

** indicates 1% level of significance.
* indicates 5% level of significance

Table 2
Factor Analysis for clubbing of variables into factors based on factor loading.

Factors	Variables	Factor loading	% of variance	Factors renamed
Factor 1	Institutional approach towards promotion of organic farming.(X_{13}); Use of mass media(X_{16}); Cosmopoliteness(x_{17}); Innovation proneness(X_{18}) and Economic motivation(X_{19})	0.711 0.782 0.791 0.696 0.419	**19.14**	**Motivator**
Factor 2	Family size(X_3); Family type(X_4); Farm power(X_8) and Organic farming experience(X_{14})	0.713 0.829 0.472 0.460	**12.70**	**Family capacity**
Factor 3	Occupation(X_5); Source of income(X_9) and Cropping intensity(X_{11})	0.591 0.575 0.388	**9.25**	**Livelihood**
Factor 4	Annual income(X_{10}) and Farm implement possession(X_{15})	0.516 0.500	**7.59**	**Farm economy**
Factor 5	Age(X_1) and House type(X_7)	0.599 0.454	**7.06**	**Socio-economic**
Factor 6	Education(X_2)	0.556	**5.58**	**Education**
Factor 7	Land holding / farm size(x_6)	-.629	**5.27**	**Land size**
Factor 8	Availability of irrigation facilities(X_{12}) and Market opportunity(X_{20})	0.539 0.393	**5.05**	**Resource use efficiency**

Total variance explained by the variance by the b factors=71.56%